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STUDY OF REGENERATIVE BRAKES SYSTEM USED IN AN AUTOMOBILE ENGINE

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ABSTRACT

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As in today's world, where there are heading towards the crispy of energy crisis and Estates are depleting at very higher rate, there is need of specific technology which are helpful for us in terms of recovering the energy which are generally wasted in the form of heat. Mostly in the automobile sector a lot of energy is lost with the help of braking system in the form of heat due to the friction occur between the brake pad and the disk .so for solving these types of problems in automobiles one of these useful technology for store the energy and reuse It, provided which are termed as regenerative braking system. In case of automobiles, energy conservation can be done by using regenerative braking systems (RBS).

Generally, in automobile whenever the brakes are applied on the moving vehicle, which resist the motion of vehicle, kinetic energy is produced and waste in the form of heat as friction between brake pads and wheel of the vehicle. The total amount of energy lost in this way depends on how often, how hard and for how long the brakes are applied.

So in the regenerative braking system (RBS). The authors of the paper have discussed and presented a method of using the kinetic energy which generally gets wasted by converting it into either mechanical energy or into electrical energy. In this system kinetic energy is converted into the electrical energy with the help of D.C motor. And this energy is stored in the battery and then this energy is supplied to the vehicle whenever it is needed.

Keywords: ***Regenerative Braking Mechanism, Battery, Electric, Motor, Flywheel.***

1.INTRODUCTION:

A. Conventional Braking System:

The term 'Braking' when a conventional vehicle is moving means the application of the brakes reduce its speed or stop its movement, usually by releasing the pedal. The braking distance in the sense of time, the braking distance is equal to taking time in the braking applied to complete stop the vehicles. In during of the braking system in conventional vehicles.

In the conventional braking system most important is the friction which is act in counter direction of the vehicle and reduces the speed of the vehicle. As the brake pads rub against the vehicle wheels or disc that is connected to front and rear axles, excessive heat energy is generated. Which is dissipated in air with helpof brakes material. The waste heat energy is equal to 30 percent of the vehicle's generated power. This cycle of friction and wasted heat energy reduces the vehicle's fuel efficiency. The total amount of energy lost in this way depends on how often, how hard and for how long the brakes are applied. Regenerative braking refers to a process in which a portion of the kinetic energy of the vehicle is stored. By a short term storage system.

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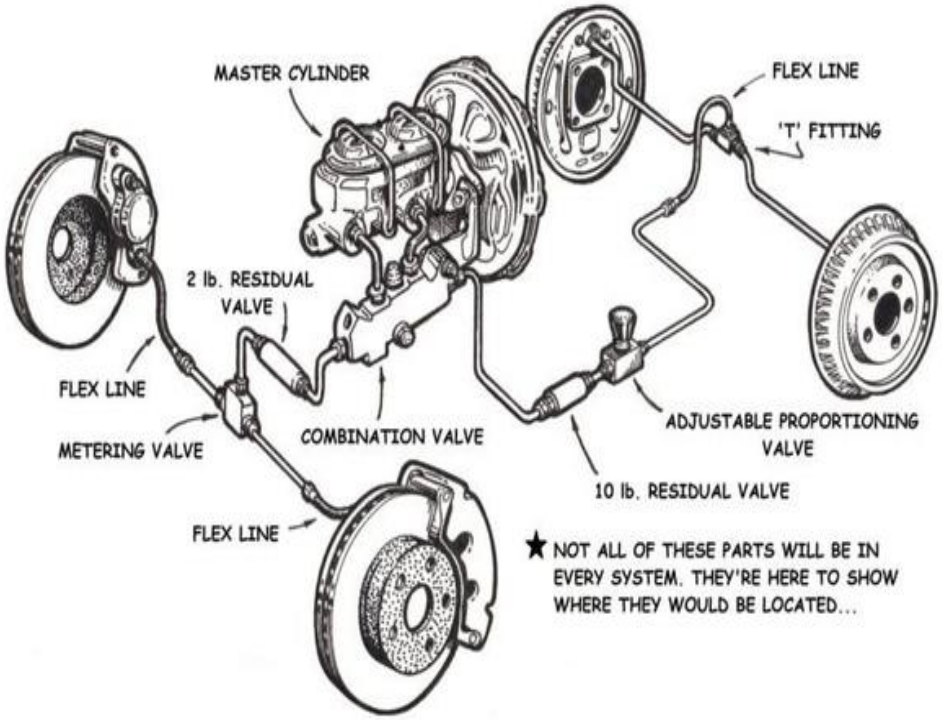


Fig.1: Conventional Braking System in Four Wheeler

B.Regenerative Braking System :

In Regenerative Braking System instead of wasting the 'Kinetic Energy' is converted into form of heat due to friction between the brakes pads and wheel it is converted into electrical energy to be stored with the help of batteries and capacitors or as mechanical energy of a flywheel having large moment of inertia. That energy, which could have been used to do work, is essentially wasted. The solution for this type of problem is Regenerative Braking System. This is a modified type of braking system that can recollect much of the car's kinetic energy and convert it into electrical energy.

Kinetic energy change into electrical energy with help of motor:

When vehicle is moving then have some kinetic energy and it is reduced with help of some mechanism when required. Inthis mechanism is used a motor and battery, the speed of vehicle reduces due to motor attach with transmission shaft .When the brake is applied. The motor is acted in counter clockwise to the power transmission shaft. The power from transmission shaft is provided to motor shaft when the brake is applied on the pads. For this work time power is transmitted.

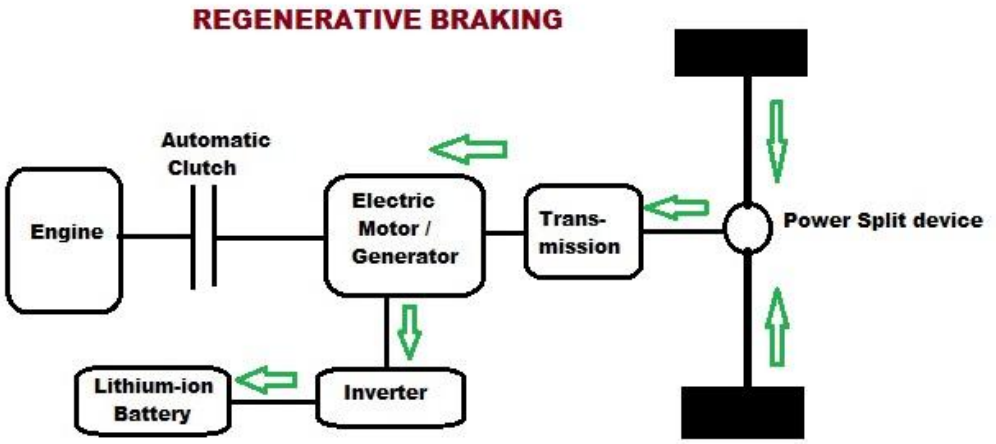


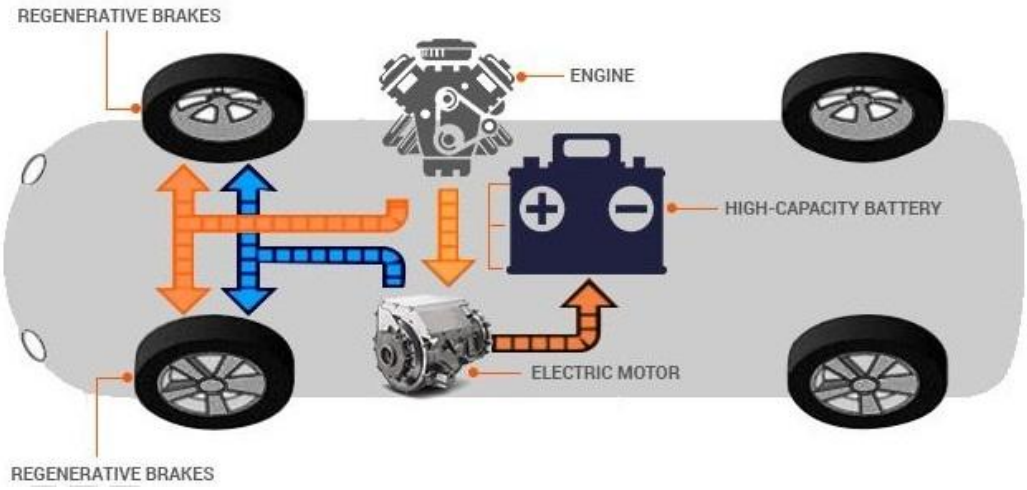
Fig.2:Diagramof Regenerative Braking system.

After this process, when the required energy is transmitted by the inverter the energy to the wheel. The energy is work the wheel as aexternal force, which is accelerated to vehicle and save the some losses such as fuel losses is termed as economical loss, and reduces time which is taken during the acceleration of vehicle. Inthe regenerativeBraking system improving the efficiency of engine by improving the braking system. Engine efficiency depends upon the output power of the engine and consumption of the fuel.

Methodology of the Regenerative Braking System:

In the regenerative braking system a most important component is used that is a electric motor . Which is work on the principle of electric motor and that is known as also generator. When the current is supplied to the motor , then the motor provided mechanical force and when external forces gives to motor, the motor provided electric current as output.

In the regenerative braking system external forces is given during braking process from the transmission shaft on the electric motor, and from the motor is supplied electric energy to the storage device and stored in storage device battery. It is used to accelerate the vehicle such as required.



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CONCLUSIONS:

The regenerative braking system used in the vehicles satisfies the purpose of saving a part of the energy lost during braking. Regenerative braking is one of the important system in electric vehicle because it has the ability to save the waste energy up to 8-25%. Besides it has a wide scope of development in future that could lead to a huge saving of energy for the world.

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